

PROTHETELY IN *EPILACHNA CORRUPTA* MULS.  
(COLEOP.)<sup>1</sup>

B. J. LANDIS AND R. H. DAVIDSON,  
U. S. Department of Agriculture, Bureau of Entomology

Prothetely in larvae of holometabolous insects has been reported for single or few individuals, usually in cases of transfer from the field to the laboratory, where the unusual development became apparent. Observers in reporting on these individuals believe the change of environment responsible and list temperature, humidity, and cumulative quantities of carbon dioxide as possible causes.

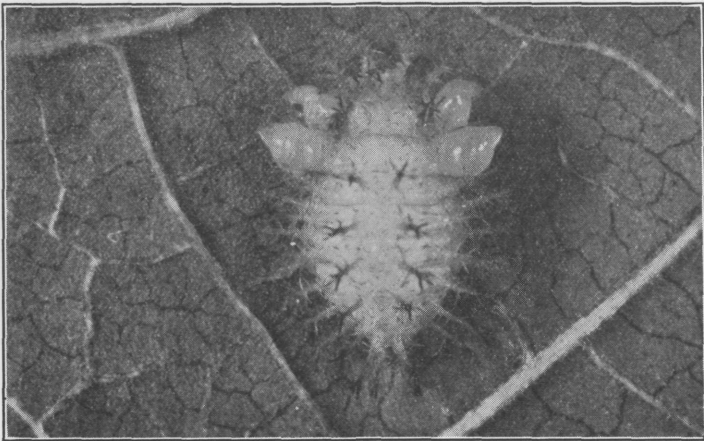


FIG. 1. Prepupa of bean beetle showing wing pads.

Such abnormal larvae, in which precocious appearance of structures is visible (Fig. 1), have been occasionally observed in laboratory rearings and field collections of the Mexican bean beetle, *Epilachna corrupta* Muls., at Columbus, Ohio, over a period of three years.

Larvae with wing pads have been observed by the writers from three separate localities under field conditions. In the summer of 1933 at Columbus they occurred in field collections

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from June throughout the summer and as late as October 3. Samples of from 200 to 400 larvae taken from a 10-foot unit length of row yielded two prothetelic larvae on two occasions. In August a larva with wing pads was taken at South Point, Ohio, approximately 125 miles southeast of Columbus, and in September a similar individual appeared in a collection from Williamstown, W. Va. In February a larva with wing pads was found among larvae reared in a heated laboratory and in early June another was taken from larvae reared in a screened

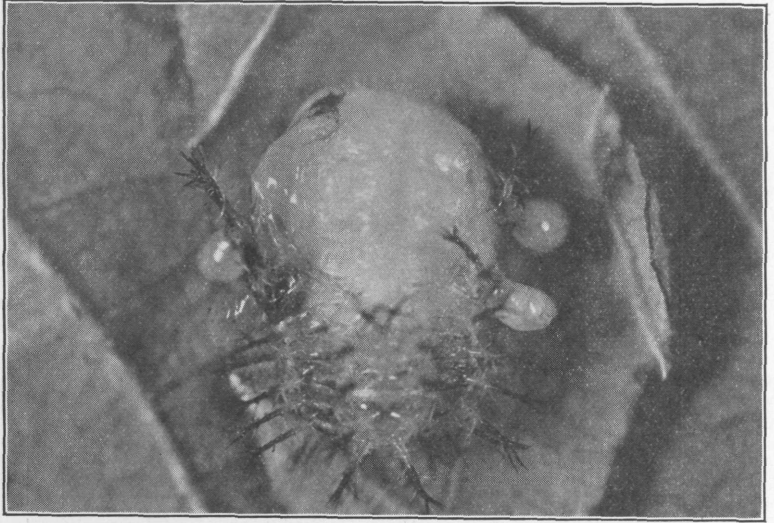


FIG. 2. Prothetelic prepupa of bean beetle sloughing the last larval cuticle.

outdoor insectary. It is estimated that one larva with wing pads had appeared for each 10,000 larvae handled at Columbus during 1932 and 1933. Probably 25 individuals have been observed in all and in September 1933 five larvae with wing pads were at hand at one time.

Wing pads have been observed only in the fourth instar of the bean beetle. This instar consists of a motile larval phase and an attached quiescent or prepupal phase. The pads appear as two pairs of soft saclike evaginations of the dorsolateral walls of the mesothoracic and metathoracic segments. These turgid pads are of nearly equal size and shape and terminate in slightly pointed tips. The mesothoracic pads are covered with irregular fine brown setae not found on the

metathoracic pair. In some individuals collected the anterior pair of pads were dead and appeared as hard black knobs.

Several prothetelic larvae in the late fourth instar were observed sloughing the last larval cuticle prior to pupation (Fig. 2). The process was not completed and the individuals died. No cases were observed where larvae with wing pads passed successfully into the true pupal stage.

The wide seasonal and environmental ranges under which these unusual forms have been observed suggest that something other than environmental factors may be responsible for their appearance.

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#### Geology of Puerto Rico.

The Geology of Puerto Rico is presented in 5 parts plus Conclusions, Bibliography, Glossary, and Index. In Part I the "Geologic Background" is presented in which the relation to the neighboring islands is set forth. Part II is "Geologic History" in which the actual known geology is depicted from the time of the volcanic core to the present form of the Island. The geologic column shows considerable volcanic rocks of upper Cretaceous age or older. Associated with these are shales and calcareous deposits, both often with much tuff. The Tertiaries are clastics and limestones of both the reef and shell types. The Quaternary is generally unconsolidated recent material. Part III entitled "Geologic Materials" is not petrography but a geologic discussion of the rocks, their structures, natural resources and the soils. In Part IV the "Geologic Present" deals with the physiography and the earthquake factors in the Island. Part V presents rather clearly the numerous questions to which answers are not known as yet relative to the geology of the region.

To briefly sum up the author's conclusions: On a shield of very ancient rock there was much volcanic activity with the regions between the volcanoes inundated by the sea. Later this volcanic-marine series was folded into mountains with accompanying intrusions of igneous rock. This mass was eroded to form the complex core. On the margins of this core were formed limestones and clastic deposits as the mass slowly sank. Then came a long series of uplifts so that the latter history is one of fluvial planation and uplift, the last uplift developing the rifts which set off the Island so abruptly. Now we have erosion working on a still unstable, tilted block.

To one interested in the Geology of the region this is a gold-mine of information. It is unfortunate that the author does not include fossil lists which are available. We hope that a latter Monograph will include them, to make the Series complete. This omission does not deduct from the value of the work. The author has spent enough time in the region to be familiar with the broader aspects of the geology and the details of numerous small areas and has made good use of the literature on the subject. Both Dr. Meyerhoff and the University of Puerto Rico are to be congratulated and we hope this new series of Monographs will all live up to the first one.—WILLARD BERRY.

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